# The Chemical Age

Weekly Journal Devoted to Industrial and Engineering Chemistry

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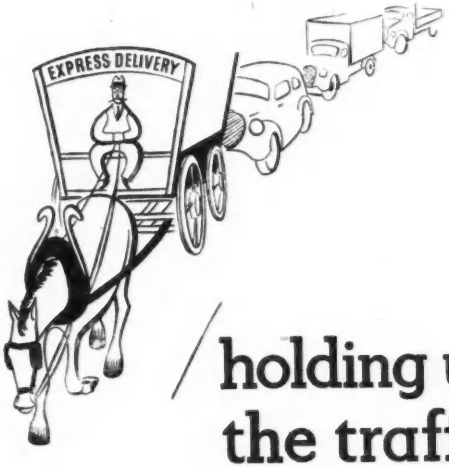
# Safety First

**This page is a monthly feature devoted to announcements in the interests of safety in Works and Laboratories.**




# holding up the traffic

If you are working to schedule on a war-time job, it is only natural that you should blame everyone but yourself if your raw materials and processing chemicals do not arrive on time. Yet, you may be holding up your own traffic. Perhaps the tank wagon that could bring your goods is still lying empty at your factory siding. Maybe quite a few carboys and drums could be found around your premises, and what about those cylinders delivered to your urgent demand more than a month ago? Returnable empty containers were not made to be discarded, but to be refilled.

ICI

***Help the chemical industry to help you—by sending back your empties NOW!***

C.N.1082


INDUSTRIALIST, farmer, coal-merchant, retailer — no matter who you are, you use the nation's transport system. Rail wagons, canal-boats, road vehicles are busy bringing goods to you and taking them away.

The whole transport system has a terrific job to do, and it is doing that job. But it will do it all the better if when vehicles come to you — you see they are unloaded or loaded and sent away, quicker, quicker, quicker than ever before.

Have a talk with your Staff — they will back you if *you* back *them* by efficient planning.

*You know your own problems best. Tackle them in your own way. But tackle them now. Plan, encourage ideas, improvise if needs be. Here's a starting-off agenda :*

1. CLEARLY WRITTEN LABELS 2. LABOUR-SAVING EQUIPMENT
3. BLACK-OUT WORKING 4. OPINIONS OF "MEN WHO DO THE WORK"

**WE MUST GET AN EVEN**

**QUICKER TURNROUND**

*Ministry of War Transport.*

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# The Chemical Age

**A Weekly Journal Devoted to Industrial and Engineering Chemistry**

**BOUVERIE HOUSE, 154 FLEET STREET, LONDON, E.C.4**

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# Solvent Extraction

THE petroleum industry has progressed very rapidly since the early rule-of-thumb days. Technique of production and refining and the demands of engineers for improved products have kept pace. That they have kept pace has been because the petroleum industry has been ready at all times to make its utmost endeavour to meet the requirements of consumers, and has spent vast sums in research and in field development to enable it to do so. The contrast between the petroleum industry and some other industries, notably the coal industry, is striking; so also are the results achieved. The developments in the petroleum industry and the expenditure of money on research are a remarkable tribute to the foresight and courage of those who have directed it. The world's supplies of coal are not inexhaustible, but so far as our generation is concerned they are virtually so. From 500 to 1000 years is the ascertained life of British coal seams at the present rate of extraction. The oil industry, on the contrary, does not know when its raw material may fail.

A comment published in 1919 by an authority declared that "America has recklessly and in sixty years run through a legacy that, properly conserved, should have lasted a century and a half. . . . The United States finds her chief source of domestic supply beginning to run dry and a time approaching when, instead of ruling the oil market of the world, she will have to compete with other countries for a share in the crude product." This statement proved unfounded because it did not foresee deep drilling and the existence of a second subterranean source of oil lower than the original deposit that was so prodigally withdrawn. Repeatedly, the approaching exhaustion of petroleum supplies has been forecast, and though these forecasts have proved unduly pessimistic, it cannot be denied that supplies are not inexhaustible, and that within less than 50 years it is quite possible that the end of natural oil will be in sight. In such circumstances, the energy with which research and development have been pursued is remarkable and provides an outstanding object lesson to other industries. We do not doubt that when the time comes for oil supplies to run short, the oil industry will not fade away, but will be ready with synthetic methods of oil production to take the place of the natural product. We

## On Other Pages

have not been very careful here in regard to supplies of lubricating oil. The quantity required is only about 10 per cent. of that of fuel oil and petrol, and we have been disposed not to bother very much about this small quantity. Actually, however, lubricating oil is a more difficult problem than power oil. For the problem involved in having no home supplies of oil, the Nazis found a solution in synthetic oil plants, coal hydrogenation, and the Fischer-Tropsch process. But they found no solution for a long time to their lubricating oil problem. Then it was found that the Fischer-Tropsch process could be operated to produce a high yield of olefines, and that from these it was possible to manufacture long-chain compounds serviceable as lubricating oils. They were, at the outbreak of war, not perhaps very good lubricants, not of the high quality of those produced by the oil industry, but they served even then, and have no doubt been improved since. Moreover, the Germans did not throw away used oil; they had before the war a system of recovery of used lubricants, by which they were reclaimed and made into a lower-grade lubricant. We have not developed this idea as we might have done, and we are virtually dependent, for all our lubricants, on imports.

The paper on the solvent extraction of lubricating oils which was read by Dr. ter Meulen before the chemical engineering bodies, an extract from which was contained in our issue of January 23, indicated the fascinating chemical problems involved in the refining of these oils. Lubricating oils are essentially oils of high molecular weight, long-chain bodies that (according to some theorists) exercise their function by becoming adsorbed on the surface of the metal and standing on their tails, so to speak, thereby interposing themselves between two surfaces of metal that would otherwise kiss and be friends too lovingly to be separated. It is essential for the proper performance of such a function that the oils should have a high molecular weight, in order that they may have long chains. It would also appear that only long-chain compounds would be suitable, and that aromatic bodies of equal molecular weight would not be good lubricants. On account of their high molecular weight lubricating oils are not distilled in the refining of petroleum, but remain with the waxes and asphalt in the residue. From this the greater portion of them is distilled under vacuum, accompanied by the waxes. Low temperatures and pressing, with or without the aid of solvents, gets rid of the wax. Then comes the real problem.

Originally, petroleum products, like coal-tar oils, were refined by washing with sulphuric acid. This is drastic treatment, and led to high losses, as it still does in the coal-tar industry. Moreover, the results were not completely satisfactory. The problem was to remove from the oils those aromatic compounds which are converted into acidic bodies of a corrosive nature, or sludges which cause the lubricating oil to block up where it should flow freely. The problem of removing the aromatic bodies was ultimately solved by a liquid extraction process, of the development of which Dr. ter Meulen gives so lucid an account. Solvent extraction is by no means new to the chemical industry, but its application by the petroleum industry to lubricating-oil purification is a model of technique that will repay study.

# NOTES AND COMMENTS

## The Nuffield Foundation

IT is a sign of the times that, although the new £10,000,000 donation on the part of Lord Nuffield to the nation is to be largely devoted to medical ends, the claims of science in industry are not forgotten. Of the five objectives assigned to the trustees of this munificent gift, the third is stated as being: "Scientific research and teaching in the interests of trade and industry." There can be few who would venture to deny that Lord Nuffield is a practical man: and he has evidently seen that if we are to enjoy the benefits of a high standard of living for all, we shall have to acquire the means to earn such a standard. In our editorial columns we have, with this end in view, repeatedly insisted on the necessity for training in industrial science. Perhaps, knowing the difficulty and expense of starting up a scheme of the magnitude

commensurate with the requirements of such an aim, men of industry and men of science have been shy of putting forward their suggestions. Now, however, that this generous gift has removed all doubt as to where the initial impetus is to come from, there is no further excuse, and the trustees should lose no time in formulating their plans. Of the seven trustees named, four are well acquainted with the workings of academic training. These are Sir John Stopford and Sir Hector Hetherington, vice-chancellors respectively of Manchester and Glasgow Universities; Professor Engledow, who occupies the Chair of Agriculture at Cambridge; and Sir Henry Tizard, who, in addition to his experience as Rector of the Imperial College, has since acquired invaluable knowledge as chief scientific adviser to the Ministry of Aircraft Production. It is to be noted that the Empire is included in the terms of the Foundation in so far as this third "objective" is concerned.

## Proximate Analysis

WHOEVER approaches the study of fuel chemistry will sooner or later be confronted with the term "proximate analysis" as applied to coal, and if he has any intelligent interest in the subject, will ask what it means, and why "proximate." The first question can be replied to with a categorical answer: the second is another matter. Mr. J. Brown and Mr. A. S. Bean, in their paper to the Institute of Fuel this week, have dealt with the first question admirably and with great interest; and they even give a sort of answer to the second question, *viz.*, that there is no real reason for the use of the word "proximate." What is meant by the term is, as is well known, the analysis of the residues of coal after the coal has been destroyed, and there is nothing either proximate, or even approximate, about it, this method of analysis being as accurate as any other form of analysis, on the average. It is, in fact, simply the name which somebody applied to the particular form of analysis concerned—somebody, evidently, with only a rudimentary knowledge of the classics. At any rate, the subject is treated with admirable knowledge and considerable humour by the authors of the paper, which should be acquired and studied by all interested in fuel chemistry. We do not propose to go into the technicalities of the subject here, but we should like to say a word on the authors' conclusion, dealing with the abuse of Proximate Analysis. We most heartily agree with them when they deprecate the overworking of this valuable ally. This method is not intended to act as a sort of magic mirror, revealing all the properties of the fuel analysed. It does what it claims to do, and no more. Bearing this in mind, it is significant that the paper is interlarded with quotations from *The Hunting of the Snark*.

## No Nitrogen—No War

PERHAPS the most constructive suggestion so far for the "disarmament" of Germany after the war has come from a distinguished chemist. At the annual luncheon of the Parliamentary and Scientific Committee, held in London last week, Sir Robert Robinson, Waynflete Professor of Chemistry at Oxford University, outlined a very simple method of depriving Germany of effective arms by the prohibition of nitrogen fixation—the only source from which the countries of central Europe can derive the nitrogen that is essential to the manufacture of military explosives. As Sir Robert succinctly stated, without explosives war is impossible under modern conditions, provided that one side, preferably one's own, has them. He pointed out that from about 1923 Germany had increased her nitrogen fixation plants to a capacity greatly in excess of her commercial requirements, and that Italy had followed suit. Yet, although Germany recognised the importance of the process, she showed small gratitude to Haber, who died in exile at Cambridge. It seemed right and proper that the process should follow its inventor into exile.

## Technical Men Required

SYNTHETIC nitrogen plants could not be improvised in a few months, and an international nitrogen commission could easily keep watch for tentative efforts at circumventing the suggested sanctions. Technical knowledge would, of course, be required, as there would be possible indirect methods of evasion: for instance, a synthetic methanol plant could be used for ammonia, and so works of that nature

would have to be curtailed or prohibited. The development of military explosives not based on nitrogen was, of course, a possibility, but a remote one, in Sir Robert's view, and even so, measures could be adopted to guard against such an eventuality. The thought occurs to us yet once again how somnolent and supine our Governments must have been between 1919 and 1939. It is quite calmly announced in 1943 that the Germans were known to have been preparing plants that could not have been intended for any but a hostile purpose; yet if any steps were taken to counter this offensive move, we, and the British public in general, are completely in ignorance of them. Truly, it is time that men of science—who must be men of courage also—had a hand in the affairs of State, if only so that they can warn the people of what their enemies are contriving.

## Empire Minerals

PROBABLY the invincible British ignorance of the potentialities of the Empire, or the Commonwealth, or whatever is the fashionable appellation, is at last beginning to totter under the hammer-blows of sheer necessity. Since it is impossible to import our requirements from large parts of Europe and of the East, we are forced to learn something about other potential sources for much-needed commodities. In trying to teach this valuable lesson, the Imperial Institute has for many years played a stalwart part and we do not hesitate to say that it has never had sufficient recognition, at any rate until recently. At all events, we surmise that its quarterly *Bulletin* is read in war-time with much more anxious care than in the easy days of unrestricted trade. Even so, we do not think that Mr. T. Deans, in an article on "The Mineral Resources of Northern Rhodesia" goes too far in stating that it is perhaps not generally realised that that area has been the leading mineral producer in the Colonial Empire since 1937, and second in importance, among African countries, to the Union of South Africa alone. Official statistics of production are not available later than 1939, but it is easy to gauge, from figures up to that date, the importance of Northern Rhodesia to the world's production of copper, silver, zinc, cobalt, vanadium, and gold, among metallic minerals, as well as of mica and graphite. The details in the current issue of the *Bulletin* are both interesting and revealing.

## Preventable Carbon Loss

LOSSES that may arise in industrial processes through the discharge of combustible material along with ash and clinker form the subject of Bulletin No. 9 issued by the Fuel Efficiency Committee of the Ministry of Fuel and Power. It points out that while circumstances may arise in which it is impossible to avoid discharging quantities of carbon in this way, much of the loss that occurs is preventable. The first steps should be to discover what loss is occurring, and then to investigate why it is occurring. Attention is also drawn to the methods by which this loss may be minimised through improved operation, and, where this is impossible, by recovery of a considerable proportion of the combustible material discharged with the ashes.

## Limiting Excess Air

FROM the same source comes Bulletin No. 10, dealing with control of excess air on steam raising and central heating plants. This useful pamphlet is designed to show how fuel waste can be eliminated, or greatly reduced, where excessive quantities of air are supplied for combustion. It says that savings in fuel could be made in most boiler plants if special attention were paid to limiting the quantity of excess air by: (1) the correct adjustment of the main boiler dampers and the secondary air slides: (2) the prevention of leakage of air into flues through faulty joints, cracks in brickwork and flue dampers; and (3) ensuring that all furnace doors, flues, cleaning traps, etc., are in good repair and fit properly. A totally different method is advocated in Bulletin No. 8. Here managements are recommended to examine the possibilities of fuel-saving bonus schemes; it is pointed out, however, that no single scheme can be specially laid down, owing to the widely varying operating conditions in different industries. At any rate, if works managers are satisfied that their plant cannot be *mechanically* improved, from the fuel-saving viewpoint, they might well consider the methods advocated in this last pamphlet.

# Toxic Gas in Industry

## American Health Service Recommendations

METHODS for the detection of toxic gases in industry have been published by the Division of Industrial Hygiene, National Institute of Health, for the United States Public Health Service, and they correspond very closely to the leaflets issued by our Department of Scientific and Industrial Research. Uses of the various toxic materials are discussed, together with methods of detection of poisoning and measures for prevention.

### Cadmium Fumes

The bulletin dealing with cadmium poisoning points out that parallel with the increase in the use of cadmium in industry, there has been an increased amount of cadmium poisoning. Industrial poisonings usually occur from the absorption of vapour, fumes, or dust, through the respiratory system, and may occur in such industries as: smelting of cadmium ores, working up of residues, welding of alloys, spraying of cadmium-bearing paints and pigments, manufacture of cadmium compounds, melting the metal, and other cadmium processes. In the reduction of cadmium ore there is a potential exposure to arsine, and the fire hazard in connection with the blue powder formed in the reduction of cadmium sulphide should be noted. Cyanogen may also be given off from the open tanks in plating.

Various cases of cadmium poisoning have resulted from the inhalation of cadmium dust or fume, while cases of poisoning by ingestion have been reported. It is possible that cases of cadmium poisoning have been mistaken for food poisoning owing to the similarity of the symptomatology of cadmium poisoning to ordinary so-called "food poisoning." For these reasons it is advisable to warn the public against the use of cadmium-plated utensils for food purposes and to caution them against having utensils cadmium-plated where repairs are necessary.

Prevention of industrial cadmium exposure depends upon the type of process involved in which cadmium fumes are generated. Where cadmium plating is done, prevention may be obtained by the use of specially designed exhaust ventilation systems. For some processes a positive pressure mask is necessary for protection of exposed workmen. An approved type of respirator is recommended where the concentration of cadmium is low; a soda-lime cartridge may be attached to the respirator when acid fume is also present in the atmosphere. The positive pressure mask should be used in all cases where the cadmium content is high.

### Hydrogen Sulphide

Hydrogen sulphide, a toxic gas which causes irritation of the entire respiratory system and of the conjunctiva of the eye, and may produce respiratory paralysis and neurological changes in high concentrations, is the subject of another bulletin. The toxic effects produced by hydrogen sulphide vary considerably with the concentration to which a person may be exposed. With high concentrations, the victim may suddenly collapse and die from respiratory paralysis. In order to prevent hydrogen sulphide poisoning, those who may be exposed to the material should be informed regarding its toxicity and potential dangers, and also of the fact that in its detection one cannot rely upon the characteristic odour because the olfactory nerve is paralysed readily by hydrogen sulphide. Toxicity may also increase with the humidity of the air, while other factors tend to increase the respiration, and may be aggravating factors.

It is essential that in all operations where hydrogen sulphide may contaminate the air, a concentration of not more than 20 parts per million be maintained by proper ventilation, preferably at the site of the formation of the gas. To destroy hydrogen sulphide in waste water, chlorination with sodium hypochlorite may prove helpful, and when rooms or enclosures have to be entered which may contain hydrogen sulphide, this should be done only with open-air masks, safety belts, and under the supervision of a crew familiar with the potential dangers of such exposure and with proper first-aid measures. In poisoning from hydrogen sulphide, the patient should be transferred to fresh air as quickly as possible, and placed under the care of a doctor.

### Benzene

Benzene (benzol) is a toxic material, a mixture mainly of aliphatic hydrocarbons. In acute poisoning it acts predominantly as a nerve poison, causing depression of the central nervous system; in subacute and chronic poisoning it causes, in addition, damage to the blood, the blood-forming organs, and the blood vessels. Benzene is used extensively in a large number of industries, and inhalation of large quantities rapidly causes inebriation. With very large doses, unconsciousness, convulsions, and death due to respiratory paralysis may occur very rapidly. In order to prevent

benzene poisoning, cleanliness of operation, especially regarding spilling of benzene or benzene containing materials, is of great importance. The pollution of air should be prevented by using closed operations whenever possible, and in case of doubt, enclosures should not be entered without proper safety appliances. Where benzene is used as a solvent and where the pollution of air by evaporation can hardly be avoided, proper local exhaust ventilation should be provided. Persons subject to exposure to benzene should undergo periodical examinations.

### Carbon Monoxide

Exposure to carbon monoxide exists in many industrial operations, including those industries which use ovens and stoves of different types, while cases of poisoning from inhalation of exhaust gases of internal combustion motors are also frequent. A general outline for the determination of carbon monoxide in air is recommended in a bulletin which states that this gas is absorbed exclusively through the lungs and elimination takes place by a reversal of the process responsible for its absorption. The primary site of the toxic action of carbon monoxide is the circulatory system, but the symptoms and signs from the central and peripheral nervous system are the most conspicuous and show great variation. The best prevention of carbon monoxide poisoning would be the prevention of any pollution of the air with the gas, and this can be accomplished to a very high degree by proper engineering methods and adequate ventilation. Persons subject to occupational exposure to carbon monoxide should be instructed regarding its toxicity and potential dangers, and before entering any space suspected of containing carbon monoxide, air samples should be taken to determine the amount. Special attention should also be paid to safety regulations. The treatment of a person with carbon monoxide poisoning should always be carried out by a doctor, although first aid must be given.

### Carbon Disulphide

Carbon disulphide is a toxic material, which in high concentrations acts as a narcotic, whereas in low concentrations and with prolonged exposure it is a severe nerve poison. Exposure to carbon disulphide may exist in a number of industries, and for the determination of carbon disulphide in air, samples should be taken where there is a known or suspected source. There appear to be considerable variations regarding the susceptibility to carbon disulphide, but there is no increase in the resistance against the toxic action. Those who handle carbon disulphide should be given proper instructions regarding the dangers of poisoning, and where possible, the material should be handled in closed systems. If drained, it should be collected under water and it should be stored under water or an inert gas which will not react chemically with it. Waste water containing carbon disulphide should not be drained into the sewer system. When carbon disulphide is used as a solvent, the room should have adequate forced ventilation, and in order to prevent explosion, vapours should not come in contact with hot pipes, hot plates or hot electric-light bulbs. Workers exposed to carbon disulphide should have periodical examinations, with special attention to subjective complaints. An examination of the nervous system, including the eye ground, is essential.

### Toluene

As toluene plays an important rôle as a starting material for the manufacture of T.N.T. in the explosives industry and is used as a solvent in the lacquer industry, the bulletin on the toxicity and potential dangers of toluene, with special reference to its maximal permissible concentration, is most interesting The conclusions reached are that single exposures of human beings for eight hours daily to concentrations of toluene ranging from 50 to 800 parts per million parts of air do not cause definite changes of the white blood-cell picture, of the circulation or of the respiration. Inhalation for eight hours of concentrations of 200 p.p.m. causes slight but definite impairment of co-ordination and reaction time, which may render persons affected more prone to accidents. With higher concentrations these effects become increasingly more marked and, with concentrations of 600 and 800 p.p.m., they may be observed after a few hours' exposure.

Experiments show that toluene is less toxic with regard to the blood and blood-forming organs than benzene, and with regard to the liver, less toxic than carbon tetrachloride. It appears that as far as toxicity is concerned, the maximal permissible concentration in air for eight hours' exposure daily is 200 p.p.m. In operations which offer specific accident hazards this concentration may prove to be too high.

### Lead Arsenate

Another bulletin deals with the effects of lead arsenate exposure on orchard-keepers and consumers of sprayed fruit. It particularly refers to the possible injury to the health of people exposed to lead arsenate, whether by ingestion on fruit, by inhalation of spray mist or dust or by other forms of exposure. It reports the results of an epidemiological study based on field operations, over a period of 1231 men, women, and children living in an apple-growing region where large quantities of lead arsenate have long been used as insecticide sprays.

# Some Pointers of Safety Wisdom—IV

by JOHN CREEVEY

SAFETY in industry, considered generally, demands conscientious adherence to basic principles in supervision, inspection, and the education of employees. Supervision by executives must be active; employees must develop an orderly outlook in thought and in procedure, and individual responsibility must find encouragement; unsafe practice in "doing this and that," as well as possible defects in plant, must be detected by continuous observation and regular detailed inspection.

When an accident occurs, it may be either the first of its kind at the works, or a repetition; the former needs immediate inquiry as to cause and contributing factors; a repetition demands strict censure for someone, not necessarily the man engaged "on the spot" at the time of the accident, for he may be in want of a little more education as to "why things happen," or of the ultimate course of events when procedure is not followed with due observance of seemingly minor details.

Only when accidents are eliminated, or at least reduced to the lowest incidence, can plant operate efficiently and economically. An accident may result in material damage to the plant, with loss in production for a period of time; personal injury reduces the number of workers available for efficient operation, and there is again loss in production. The replacement or repair of damaged plant can be costly; so, too, can compensation for personal injuries. If there is a fatality, the effect on the morale of fellow workers is not to be ignored. Serious disaster causes someone to lose confidence in someone else.

Every works should have its general committee for safety matters. On this there should be not less than three persons serving, one of whom should be an employee holding a position of authority, and another a foreman or some other employee who is well able to present the workers' viewpoint. This committee should meet regularly once every week or once every month, and otherwise when occasion demands it. As part of its duties, it must supervise inspection work related to safety and to plant maintenance; it must decide on safety recommendations; it must see that new employees have the possible hazards of their work explained to them; it must receive a report on all accidents, so that the cause can be investigated properly and immediately (if there be urgent need), and that methods may be devised and adopted to prevent similar accidents. The duties of the committee are not light, and they must be carried out conscientiously.

The repetition of an accident shows that someone needs to be reminded that there may be yet another similar occurrence. One accident is unfortunate; the second is possibly preventable; the third, save in exceptional circumstances (or in the common course of minor things, "each man to have his experience"), points seriously to negligence.

Plant inspection should be continuous throughout the year, a competent person making weekly reports to show the condition of all plant and equipment and any changes which appear desirable in the matter of maintenance, in the removal of hazards, and for easier and more convenient working. Cleanliness, ventilation, lighting, storage of material, and disposal of waste, are all matters which need comment in plant inspection.

Fire, and its consequences, must be given detailed thought, with particular regard for the lay-out of buildings, the nature of process operations, the chemical materials involved, and the storage of materials. When a fire breaks out, it is too late to plan means to prevent it from spreading: immediate decisions then have to be made for that purpose. It is wise to plan for safety in relation to fire with advice offered by the chief of the local fire brigade; practical experience of fire-fighting points out difficulties that are not otherwise specially obvious. Let the chief of the local fire brigade inspect the works; even with an efficient works brigade there may still be need of outside assistance.

It should be the duty of someone (in the absence of a full-time safety officer or fire chief) to inspect regularly all fire-fighting equipment, especially hoses and couplings, and hydrant valves; fire pails (water and sand) must be kept full, the exits from buildings and interior passageways must be clear at all times. Where trolleys have to be loaded, there should be special bays or clearance space to accommodate them.

For the testing of equipment such as hoists, conveyors, electric motors in particular usage, pressure vessels, etc., special arrangements may have to be made, with assistance from outside the works, as when the maker of the equipment contracts to do this. At all such inspections the works

safety officer should be present to make his own written report for filing with that of the competent testing authority. The dual report serves a useful purpose in the case of an accident involving compensation for personal injury.

The works safety officer should report to the safety committee that drawings and specifications for new plant and machinery are satisfactory from the point of view of recognised safety standards, especially as regards the elimination or safeguarding of dangerous mechanical features. He must inspect the plant and machinery both when it is delivered and unpacked and when it is installed, seeing that any needful safeguards are in place before the plant or machinery is set in operation.

Where an inspection committee is composed of foremen and workmen, it is desirable that the personnel be changed at intervals, preferably by rotation from a list of all responsible employees. It must be pointed out that the changes imply no suggestion of inefficient service, but are made solely for the purpose of encouraging individuals to share responsibility for the safety of their fellow workers.

The submission of ideas for safer working should be encouraged from all classes of employees, monetary or other reward being forthcoming for ideas adopted. Safety, let it be remembered, is the concern of all employees, and those engaged in a particular task can often see possible hazards and how they are best avoided to advantage by comparison with visual observation on part of another person. The works safety officer should encourage workers to speak of their difficulties.

For employee education in safety matters, it does not suffice to display posters and merely to use a notice board on which safety orders, new rules, and allied information can be exhibited; the law, in the posting of orders and rules, has implied satisfaction, but the extent to which this information makes due impression in mind and memory varies individually from one employee to another. It is wise, therefore, for safety talks to be given to employees assembled together in groups, or to the whole works personnel, at least once every six months. Such meetings can be arranged without seriously interfering with production, and even if there is direct loss of "production time," the advantages gained in preventing "time lost by accidents" are immense—as accident record sheets prove.

## A CHEMIST'S BOOKSHELF

CHEMISTRY AND THE AEROPLANE. By Vernon J. Clancey, A.R.C.S. Edinburgh: Nelson. Pp. 172. 5s.

To the thousands who watched the Battle of Britain, it is not immediately apparent that chemistry has played any particular part in the development of flying, but the author in this little book attempts to provide some sort of link between the theory of chemical text-books and the practice of flight. "Without chemistry," he says, "there would have been no aeroplane. To understand the part that chemistry has played in making flight possible and conversely the effects of flight on chemistry, it is necessary to look at its development as a whole." The author discusses such subjects as petrol and other fuels, steel and non-ferrous alloys, plastics, chemical energy and the behaviour of gases, lubricants, rubber and synthetic rubber, and accumulators, and he has worked on the assumption that the reader has some slight knowledge of chemistry. His secondary aim has been to show that the rôle of chemistry in the development of the aeroplane is part of a general dynamic process, the continual struggle called progress. He has chosen to emphasise the historical aspects of the subject, to see the present as the outcome of a long history of change, and, in order to understand the present, to examine these changes. The book is priced within modest reach of the student, and is one in the series of Nelson's Aeroscience Manuals.

ENDEAVOUR (Volume II, No. 5, dated January, 1943) continues its good work of broadcasting the achievements of British scientists, both bygone and contemporary, to the outside world. As we have mentioned before, it is translated into Russian, French, Spanish, and German, and we have a shrewd suspicion that its unbiassed account of scientific events may well have a more permanent influence from the propaganda point of view than some more strictly official literature. Whatever may be its effect outside this country of "putting British science across," it certainly retains its interest for the individual British scientist. Of special chemical interest in the present issue are articles by Dr. L. Levy and Mr. D. W. West on luminescent substances (a subject they recently dealt with in THE CHEMICAL AGE); by Dr. A. Haddow on carcinogenic chemical compounds; and by Professor Allan Ferguson on surface tension measurement, a physico-chemical problem of great interest that has been too little studied. The price of the issue is five shillings.

# The Prevention of Dermatitis

## Simplicity and Effectiveness of Barrier Creams

TO talk nowadays about the *cure* of dermatitis, in industrial circles, is to be old-fashioned; cases unhappily do still arise, and must be treated, but they are no more to be regarded as inevitable than is a broken limb. The *prevention* of dermatitis, however, is the duty of all connected with the chemical and allied industries; and, happily, thanks to the progressive researches of chemists themselves, this is becoming easier every day.

Beauty may be only skin-deep; but if that is so, there is all the more reason for workers to take care of their skin. No doubt the influx of women workers into the chemical industries has hastened the preparation of suitable precautionary measures; but nowadays there is no reason why the skin of any industrial worker should not be kept clean, dry, and flexible.

Dermatitis, besides being a most distressing complaint, is a notorious time-waster. In the present urgent hour it must at all costs be avoided, as its cure is usually a tedious process, and time is precious. The simplest way of dealing with the situation, where irritant materials are involved, is obviously to keep them from contact with the skin. Rubber gloves and similar mechanical means have, of course, been tried, but they are unsuitable for many purposes, and besides there is a shortage of the raw material. Far simpler and more satisfactory is the barrier cream system, which interposes an impalpable glove between the skin and the irritant.

### Research Development

Different types of irritant require different barrier creams, and it is in the development of these individual creams that some of the most interesting work has recently been done, and, indeed, is still undergoing development. The Innoxa Laboratories, where in peace time the care of beauty is the first interest, have turned their attention, in time of war, to the protection of the skin of industrial workers. Mr. A. S. Hull, their chief chemist, has evolved two completely new series of barrier creams, entitled "B.Q." and "B.Q.N.," the formulæ of which are deposited with H.M. Senior Medical Inspector of Factories, who is advised of all changes in composition.

The B.Q. series is designed to afford protection to the skin from materials immiscible with water, such as grease, paint, varnish, paraffin, solvents, and so on. Creams in this series are elastic, pleasant and easy to apply, equally easy to wash off, and economical in cost. Not only does the protective film (which is quite invisible) afford a guard for four or five hours, but the cream incorporates a non-conducting loading factor with a tendency to reduce the heat of the skin, making it suitable for workers employed in high-temperature processes. The "reconditioning" element comprises a saponified compound of cerostearates and a chloresterol absorption base, which serves as a repairing agent against moderate surface damage. The bacteriostatic value of the film has been determined by the agar cup method and the Rideal-Walker index is 5. Typical of the series is B.Q.5, which has been found invaluable for a wide variety of applications; B.Q.6 is specially intended for use with tar and creosote; the newly developed B.Q.7 is effective against varnishes and lacquers.

For irritants and abrasives soluble in or miscible with water the B.Q.N. series is appropriate. Not unnaturally it takes a little longer to dry, on first application, but it is equally easy to remove. B.Q.N. 1 and 3 are used against irritants of an acid or neutral character, and for plating solutions, photographic chemicals, and oil-in-water emulsions; B.Q.N. 2 and 4 are for dealing with alkalis, alkali soaps, and explosives.

### Before and After Use

It is important to ensure that the skin is perfectly clean and dry before the cream is applied, particular attention being paid to the nails and quicks; and only a small portion of the cream—about half a teaspoonful—should be used on each pair of hands. The B.Q. creams are removed by washing the hands with warm water and soap, when the film will swell up to form a translucent glove, taking the superimposed grime with it. The B.Q.N. creams are just as easily removed with soap and flowing hot water.

The merits of Innoxa Barrier Creams have been endorsed by works medical officers and works managers throughout the country, and a film showing the creams at work has been prepared for exhibition to workers. Most satisfactory, however, is an actual demonstration of the creams in action, and Mr. Hull, with the consent of the proprietors, Innoxa (England), Ltd., arranged a most convincing display of the simplicity and effectiveness of the creams to a representative of THE CHEMICAL AGE. He has agreed to repeat his special demonstration for the benefit of interested readers of THE CHEMICAL AGE, if they will apply, suggesting times and dates, to Innoxa Laboratories, 233-241 Balls Pond Road, N.1.

# Chlorinated Rubber

## An Outstanding Modern Chemical Product

IN these days of serious world shortage of rubber, which is essential for an astonishingly large number of applications, quite apart from tyres, one of the most valuable uses, and especially as regards the war effort is for the manufacture of Detel, a special variety of chlorinated rubber.

This is the invention, patented and placed on the market in 1931-1932, of F. C. Dyche-Teague, the technical director of Detel Products, Ltd., Greenford, near London, the latter works having started up in 1934, succeeding an earlier works at Walthamstow. In this connection it should be emphasised the product is British throughout and, on familiar lines, the claims made for German priority are entirely without foundation.

The outstanding characteristic of Detel is its extreme resistance to almost every known chemical reagent, including all strong and dilute mineral and organic acids, even including hydrofluoric, and caustic alkalis, and a wide range of strongly reactive substances, typical of which are oxygen, ozone, chlorine, bromine, potassium cyanide, alcohol, methylated spirits and hypochlorites. Neither is it acted upon by the atmosphere nor by sea water, so that one of the most valuable applications is the prevention of the corrosion of steel, and of all metals, and the treatment of many other surfaces such as brick, stone, artificial stone, wood, plaster, paper, and fabrics. Equally valuable also is its application to the treatment of concrete surfaces not only for protection against all kinds of deleterious gases and solutions, but also in the way of water-proofing and dust-proofing.

### Resistance to Fire

Included in the valuable properties are very high electrical insulation and resistance to fire. For no very clear reason, from the scientific point of view, the relatively high chlorine content gives such resistance to fire that the only result even of the direct action of a blowpipe flame is to cause a slight smouldering, a striking difference as compared with rubber. The latter is, of course, not only very inflammable, but peculiarly dangerous as regards fire because of the choking fumes and the great difficulty of extinguishing the combustion.

So far as concerns the electrical properties of Detel the insulation is within the range of $3.05 \times 10^5$ and $5.50 \times 10^5$ megohms per cubic metre at 500 volts. The dielectric strength is equally remarkable, and films of 0.27 and 0.21 mm. thickness showed, under test, a breakdown pressure of 11,800 and 11,500 volts, being 43,700 and 54,800 volts per mm. film thickness. There is also a high degree of resistance to moisture penetration, and the importance therefore for cable manufacture, and electrical work generally, will be obvious.

The details of the manufacture of Detel, like many other chemical processes, are not available, but the product is sold in various forms, the number of which has been increased as the result of extensive research and development work. Originally, it was made available in solution in an organic solvent, and this still constitutes one of the main forms. The liquid, to which colouring pigments can be added, is applied to metal, concrete, or other surface by means of a brush or spraying machine, on the same lines as paint, and dries off after about two hours, leaving a film which not only possesses the properties of resistance already mentioned, but is also highly tenacious and non-poisonous. Further, it does not penetrate to any distance into the surface, so that the most porous and absorbent material, such as wood, plaster, or asbestos composition, can be easily treated.

### Valuable Substitute

For steel the main form of the product is known as "D.M.U." which contains a very large proportion of finely divided metallic zinc. This has the effect of still further increasing the resistance to corrosion by the atmosphere, by acid fumes, and by sea water and sea air, because the minute electrical currents associated with corrosion tend to attack the zinc particles and not the steel surface. In this connection there is another special modification, known as "Export D.M.U.," in which the film is resistant up to 100° C., forming a valuable substitute for galvanising. Still another modification is a thick spreading paste, applied with a palette knife, small trowel, or similar implement, particularly suitable for treating the inside of tanks, vats, and similar equipment and stopping leakages in underground conduits, etc.

Valuable also for the lining of tanks and other apparatus is Detel sheeting in the form of very thin (0.01-0.04 inch) soft flexible black sheeting which can be cut with scissors and used for lining, jointed at the edges by painting with a special solvent cement, thus forming a completely impervious surface in a few minutes. This modification is also particularly suitable for the covering of pipes, including flanges and valves, and for pipe jointing.

The interest of the product, therefore, for the chemical and allied industries, especially in dealing with the most difficult problems

arising from corrosion, will be obvious. Another of the main applications is the protection of the steel hulls of ships from corrosion by sea water, but security reasons preclude, for the present, all reference to the latest developments in this direction. For this reason alone Detel is essential to the war effort, and a good point is that the amount of rubber required is very small, since 1 lb. of chlorination is sufficient to provide adequate protection for 1800 sq. ft. of steel surface.

The extreme resistance given to the penetration of gases and moisture has also found a new outlet in the treatment of cans and other food containers, which have to be transported or stored under severe conditions such as exposure to sea water and air on the decks of ships or to damp atmosphere in rock tunnels. Still another application is painting the soldered seals of containers for dehydrated foods, the product for this purpose being supplied in the form of a clear lacquer. The company, during the past ten years, has had unequalled experience in dealing with difficult corrosion problems; the potential uses of Detel seem to be almost unlimited, especially in view of the large (and rapidly increasing) number of actual applications already in existence.

# Chemical Control in France

## Growing Importance of the Comités d'Organisation

FRENCH chemical industry has been subjected to an increasing measure of Government control, and the various regulations for the most suitable allocation of the limited supplies of chemical and allied products have been collected under a systematic control arrangement which has been in force now for eight months. Chemical products are divided into four groups. The first of these comprises the so-called "controlled goods"; from the long list the following may be selected as illustrations: Acetone, sulphuric acid, hydrochloric acid, amyl and butyl alcohol and acetate, ethyl and methyl acetate, phthalic anhydride, barium carbonate, barium chloride, boric acid, calcium carbide, chromic acid, coumarin resin, coal tar, coal-tar oils, anthracene, cresol, phenol, pyridine, toluol, xylol, solvent naphtha, sulphur, copper sulphate for industrial purposes, lead oxide and carbonate, and soda.

The second group, which comprises the so-called "supervised goods," is subdivided into two classes, "seized" and "regulated" products. The former are similar to the articles in the first group in so far as they are subject to Government control, but this control is exercised only with regard to producers and importers; once the products have left the first holder, they are no longer subject to general control. The second subdivision comprises goods which are only subject to Government regulations. The "supervised, seized goods" include citric and tartaric acid, gold, platinum, silver and bismuth salts, camphor, caffeine, chlorine, chemical fertilisers, ethylene glycol, resin tar, iodine and iodides, lanoline, zinc oxide, insecticides and fungicides, pyrites, arsenates, etc. The group of "supervised, regulated goods" comprises many paints, glues, caustic acid, derivatives of calcium carbide and casein, several synthetic resins, sodium and potassium silicate, synthetic tanning extracts, organic acetates, arsenic, and wood-tar derivatives.

Chemical products which are neither "controlled" nor "supervised" are theoretically free, but in fact they also are subject to a large number of detailed restrictions and regulations; their use is normally free for certain purposes only and even then within definite limits. All questions of allocation are in the last resort subject to the decision of the Office Central de Répartition, but in practice the decision is now mostly in the hands of the Comités d'Organisation which have been formed for various spheres of industrial activity. The Comité d'Organisation des Carburants de Remplacement, for instance, not only controls substitute fuels as used for gas generators, and liquid substitute fuels, but also supervises shale-oil extraction and the distribution of petroleum derivatives, of all motor fuels in fact with the exception of alcohol

Of particular interest are such specialised arrangements as that of the price equalisation charge for pyrites which has the purpose of ensuring, to sulphuric acid manufacturers who base their production on pyrites, a constant margin between the price of pyrites and that of sulphuric acid. The arrangement is in the hands of the Société Commercial de l'Acide Sulfurique S.A., which is subject to control by a Comité d'Organisation. Another important arrangement is that governing the production and sale of compound fertilisers. These have been standardised both with a view to encouraging their use by farmers and in order to reduce transport costs by the selection of a few materials of comparatively high concentration. Apart from that, it is hoped to reduce costs by standardisation and to permit sparing use of materials in short supply.

# British Industrial Plastics

## Some Pointers for British Industry

IN conformity with the prevailing war-time practice, the chairman of British Industrial Plastics, Ltd., Mr. Kenneth Chance, has circulated a statement to shareholders along with the report and accounts, prior to the annual general meeting, which is to be held on February 25. In the course of his statement, after referring briefly to the company's position, Mr. Chance makes some remarks of interest not only to the plastics industry but to chemical industry in the widest sense, and indeed to British industry in general.

Referring to the development of aminoplastic moulding powders, Mr. Chance emphasised that when, in the course of such development, openings occurred for the use of one of the products of the group in an established industry either in conjunction with or replacement of another material, it was their policy to seek co-operation with that industry. The first example took place just before the outbreak of war in the formation of a new company in which two leading manufacturers in High Wycombe joined the company as shareholders with the object of investigating the possibilities of aminoplastic mouldings for use in the manufacture of furniture. A second step had now been taken in co-operation with another industry by selling to Buttons, Limited, and to C. A. Sperati (The Special Agency), Limited, between them a majority holding in the subsidiary company, Colfast Buttons, Limited. The directors of British Industrial Plastics would welcome the initiation by others either from within or from outside the plastics industry of negotiations for similar co-operation.

### Basic Raw Materials

How far the chemical industries in general are involved in the plastics industry is obvious from a quotation which Mr. Chance made from a report compiled by a committee of the British Plastics Federation: "The plastics industry depends largely for its raw materials on the chemical industry, coal, water, and limestone being the principal basic raw materials. Phenol, cresol, benzene, and coke are obtained from coal by distillation. Formaldehyde, once made exclusively from wood alcohol, is now made synthetically from coke and air. Urea is made from synthetic ammonia and carbon dioxide. Acetylene, the basis of the vinyl plastics, is made from limestone and coke. Another important raw material, cellulose, is obtained from cotton linters or wood pulp. It will be appreciated that, whilst most of the basic raw materials for the plastics industry are available in abundance in this country, elaborate and costly plant is required to convert them to the required form." Owing to the necessity for this elaborate and costly plant to produce the chemicals required for conversion into plastics those chemicals can only be made economically on a large scale by concerns with great financial resources. In such cases the interests of the country may best be served by confining their manufacture to one factory, and thus conferring monopolistic powers upon the manufacturers.

There must, however, be mutual confidence, writes Mr. Chance, between those who have the financial and technical resources to instal and operate that costly and elaborate plant, and those whose function it is to develop the new industries. Producers of the chemicals must be sure that consumers will be found for them, and consumers must be equally sure that when they have developed new products and thus created markets for those chemicals they will not be subjected to competition in the manufacture and sale of those products from the manufacturers of their raw materials. Such competition is disruptive of the confidence essential to progress and equally disruptive of co-operation in industry.

### More Enterprise Needed

Coal and limestone, the principal sources of the raw materials required, being plentiful enough in this country, it was difficult to understand why even now there were few signs that this country's native resources would be utilised to the best advantage for the production of these raw materials. The distillation of coal would provide them and yield as a by-product gas for the generation of electricity. Yet the tendency seemed to be to concentrate on the work done in the United States in deriving these raw materials from oil instead of coal and on schemes for the generation of electricity from water power in Scotland. "We laboriously blast our coal," writes Mr. Chance, "and drag it to the surface for consumption in our grates and our factories, befouling the atmosphere with smoke which contains the very raw materials that we want for making into plastics, and wasting the gas that ought to be used for generating electricity to make other raw materials for plastics. Sixty years ago an Englishman forecast that the day would come when coal would be carbonised *in situ*, thereby releasing its power in the form of gas containing constituents of great value for recovery and use as raw materials for plastics, but it has been left

to Soviet Russia to translate that forecast into practical operation."

Mr. Chance quoted the failure to develop the calcium carbide industry as another instance of lack of enterprise in this country. The importance of carbide in the modern world, he says, is such that it may well happen that before long the yardstick by which the industrial prosperity of a country is measured will be carbide in place of steel. Yet before the war in this country, where coal and limestone are found in quantity, quality, and convenience of location equalled by few, if any, other parts of the world, none was made. The installation of carbide plants would give employment to the steel industry, the electrical industry, the building industry, indeed to all the older industries; the operation of such plants would give employment to the mining industries; and the produce of the plants would provide raw materials for employment of great and increasing numbers in the production of plastics and other necessities of the modern world.

He concluded that we had been so immersed in commerce that we had ignored the fundamental truth that commerce should be the servant of industry. The pernicious doctrine that we must buy in the cheapest market "in the interests of consumers" reached its logical conclusion a decade ago when prices were forced down to a point where the wherewithal for consumption disappeared. It was the producer whose interests should be the first objective.

### A Call for Development

Mr. Chance ends his statement with a clear call for the proper development of the raw materials of this country. If, he writes, "those to whose lot has fallen the duty of developing the native raw materials of this country fail to develop them to the best advantage of the country: if they make use of the materials they produce therefrom to compete in the manufacture and sale of products for which their customers have opened up markets instead of helping them further to develop those markets, particularly if such competition comes from those who hold a monopoly in the manufacture of the raw materials, this country will fail to take the place in the industries of the modern world to which it is entitled.

On the other hand, by co-operation, by confidence in one another, and by unity of purpose in the country's interests, there is nothing to prevent Great Britain gaining the leadership of the world; and, if in time of war our production of materials of war per head of the population can exceed those of any other country in the world, so should we, when peace comes, exceed other countries in the production of materials for the benefit, in place of the destruction, of mankind."

## INDUSTRIAL ALCOHOL COMMITTEE

The Chancellor of the Exchequer, in reply to a question in the House of Commons, has announced that he has appointed a committee to examine the question of the grant of an allowance on industrial alcohol which has been made since 1921 under Section 15 (2) of the Finance Act of that year. He said that conditions had greatly altered since 1921. All the members of the committee, which has begun to sit, were formerly members of the Import Duties Advisory Committee. They are: Lord May (chairman), Sir Percy Ashley, and Sir Allan Powell, with Sir Harold Howitt as assessor. The secretary is Mr. W. Rendell, of the Treasury.

## COPPER COMMITTEE

The United States, Great Britain, and Canada have set up a combined copper committee in Washington to ensure that supplies of the metal are used to the best advantage in war production. Mr. H. O. King, Junior, director of the copper division of the U.S. War Production Board, is to be chairman, and will be assisted by a staff of American, British and Canadian representatives. Mr. M. I. Michaels represents the British Ministry of Supply Mission. The task of the committee, appointed by the Combined Production and Resources Board and the Combined Raw Materials Board, will be to collect and review details of requirements, stocks and consumption.

## SWEDISH-GERMAN CHEMICAL TRADE

No more export credits are to be issued to Germany by Sweden, states the *Anglo-Swedish Review*, commenting on the Swedish-German trade agreement for 1943. Instead, the system of exchange of goods hitherto operating is to be continued. Germany has promised to deliver 5 million tons of coal this year.; also 300,000 tons of iron, 100,000 tons of potash, 220,000 tons of common salt, 60,000 tons of glauber salts, 30,000 tons of soda, 30,000 tons of calcium chloride, 5000 tons of water-glass, 3800 tons of cell-wool, 1200 tons of artificial silk, and 1800 tons of Buna. In the first six months of 1943 Sweden is to deliver to Germany 100,000 tons of cellulose pulp, as well as 40,000 tons of paper, and timber products to the value of 36 million kronor. Quantities for the latter half of the year will depend on German coal deliveries; it is noted that out of 5,700,000 tons of coal promised in 1942, only 3,800,000 were delivered.

## Personal Notes

MR. L. V. KENWARD has resigned his position as director of the Rubber Products Group of the Dunlop Rubber Company, Ltd., after 35 years' service with the company.

MR C. W. MAPLETHORPE, F.I.C., A.M.Inst.Chem.E., has been co-opted on to the Council of the Pharmaceutical Society. He is also a member of the Society of Chemical Industry.

MR. H. A. CURRAN, A.I.C., A.R.C.Sc.I., A.I.R.I., has retired from the technical directorship of Hubron Rubber Chemicals, Ltd. The company will retain Mr. Curran's services as technical consultant.

MR. GEORGE H. DUNCAN, having been appointed Director of Methanol and Formaldehyde under the Ministry of Supply, Molasses and Industrial Alcohol Control, has meantime relinquished his position as a director of Barter Trading Corporation, Ltd.

MR. R. V. SOUTHWELL, Rector of the Imperial College of Science and Technology, has been elected to an honorary Fellowship at Brasenose College, the college at which he held a Fellowship when he was Professor of Engineering Science at Oxford University.

MR. ROBERT MCLEAN, secretary of Lever Brothers, Port Sunlight, Ltd., has retired. He has been with the firm and its associated companies for about 40 years. He will continue as joint assistant secretary of Lever Bros & Unilever, Ltd., until the end of the war.

SERGEANT JOHN EUSTACE, R.A., who was awarded the D.C.M. for great bravery when in charge of a gun with the 1st Army at Tebourba on November 27 (*London Gazette*, February 12), was an employees at the Everite works and with McKechnie Brothers, Ltd., Widnes, before being called up in June, 1939.

MR C. A. MASTERMAN, M.A., F.I.C., M.I.Mech.E., M.Inst.Gas E., has been appointed Convener to the Post-War Planning Committee of the British Gas Federation, in succession to the late Mr. Stephen Lacey. Mr. Masterman was for many years chief technical officer at The Gas Light and Coke Company's research laboratories at Watson House. On the outbreak of war he returned to his former work with Chemical Defence Research, first as assistant-director at the Ministry of Supply and later as acting-superintendent at the experimental station. In 1942 he transferred on to the technical staff at the Gas Directorate. He is a member of the Gas Research Board council and of various committees in the industry and in the Ministry of Fuel.

SIR CHARLES DARWIN, F.R.S., Scientific Adviser to the Army Council, will return to his duties as Director of the National Physical Laboratory on March 1. He will be succeeded by the Deputy Scientific Adviser, PROFESSOR C. D. ELLIS, F.R.S.

## Obituary

DR. RONALD TASKER, of the Burmah Oil Company, who was last month reported missing, is now known to have died through enemy action at sea in November last.

MR. EVELYN HURDEN, chairman and managing director of the Universal Asbestos Manufacturing Co., Ltd., died on February 13, aged 58.

## New Control Orders

### Fish Liver Oil

The Ministry of Food announces that the Order made in 1939 prohibiting the manufacture and processing of cod liver oil and the mixing of cod liver oil with vegetable and marine oils except under licence will be revoked as from April 5. A new Order has been made prohibiting the manufacture and processing of any fish liver oil and prohibiting the mixing of cod liver oil or any other fish liver oil with any other liquid for the purpose of animal or poultry feeding, except under licence. From April 5 all fish liver oil mixtures for animal and poultry feeding will be manufactured under the direct control of the Ministry of Food. No licences will be granted for the manufacture of water emulsions of fish liver oils for animal and poultry feeding (S. R. & O. 1943, No. 211).

## Laboratory Ware

### Standardisation of Design

THE British Laboratory Ware Association, Ltd., has formed a Technical Committee, the objects of which are as follows: (1) to promote closer co-operation between bodies responsible for the design of standard laboratory instruments and apparatus and the manufacturers of same; (2) to assist in rationalisation of the design of apparatus and to eliminate overlapping, with the aim of securing economical production; (3) collaboration to these ends with standardising authorities, research associations, etc., in the drafting of specifications. It is hoped that research and other associations will avail themselves of the facilities offered in order that improved service and quality may result in users of the apparatus. All communications should be addressed to the Secretary of the Technical Committee at 73 Basinghall Street, London, E.C.2.

# General News

## From Week to Week

**The sum of £200** has been presented to the Merchant Navy Comforts Service by the British Phosphate Commissioners, Ebury Street, S.W.

**J. Bibby and Sons, Ltd.,** oilcake manufacturers and seedcrushers, of Liverpool, have made a gift of £250 to the Department of Inorganic and Physical Chemistry, and £250 to the Veterinary School of Liverpool University.

**All who wish to attend** the second conference on X-ray Analysis in Industry, to be held in Cambridge, on April 9 and 10, must communicate with the Secretary of the Institute of Physics, the University, Reading, Berkshire, before February 24.

**A summary** of current literature on water-pollution research (Vol. xv, No. 3: Abstracts Nos. 225-348), dated March, 1942, has been prepared by the D.S.I.R., and is published by H.M. Stationery Office at 2s. 1d. (post free).

**Limited quantities** of Russian liquorice root, henbane, and buckthorn bark have been released for distribution for pharmaceutical purposes by the Ministry of Supply. Manufacturers requiring these drugs should get into touch with their usual sources of supply.

**The Eire Minister for Supplies** announced in the Dail (Parliament) in Dublin recently that the requirements of alcohol for scientific, laboratory, and hospital use had been met by the Irish industrial alcohol factories since November, 1941.

**Coal savings equal** to the output of some 270 miners are expected to be made in the current year, as compared with 1941-42, in Government buildings. Total anticipated savings are 79,712 tons, or 18.3 per cent. of the consumption for the previous year.

**Women who have reached** the school certificate standard in mathematics, chemistry, physics, or general science, and who feel that their present occupation is not using their qualifications to the full, are asked to enrol in the Women's Technical Service register of the Ministry of Labour.

**An Abrasive Soap Manufacturers'** Committee has been formed to be of mutual assistance in all matters appertaining to the industry. Mr. W. Hill, the County Chemical Co., Ltd., is chairman, and Mr. N. Draycott, Peter Lunt and Co., Aintree, Liverpool, 10, is secretary.

**Lever Brothers**, of Port Sunlight, have just beaten the Shell Refining Company, of Ellesmere Port, in a contest based on the amount of savings for every £1 earned; the final figures showed an increase of 296 per cent. for Levers, against 275 per cent. by Shell.

**A project for the production** of methane gas is being examined by the Stalybridge and Dukinfield Joint Sewage Board. The Board has received authority to proceed with the scheme and is guaranteed by the Government against financial loss. It is estimated that there will be an initial outlay on plant of about £10,000.

**Improvement of scientific methods** in extracting the heat-value of coal should, in the not too distant future, enable the country to save 75,000,000 tons of coal a year, said Mr. E. W. Salt, M.P., chairman of the Parliamentary Scientific Committee on Monday. The surplus thus saved could be exported or used for making plastics or many other purposes.

**A display at the National Gallery** of Scotland, Edinburgh, open for three weeks from Friday, February 19, illustrates the work of the British Colour Council for the co-ordination of colour and design. This is the first display of its kind to be open to the general public. It will be opened by Sir Steven Bilsland, Bart., Chairman of the Scottish Committee of the Council for Art and Industry.

**The Chemical and Allied Trades** section of the Manchester Chamber of Commerce reports that while most sections of the chemical industry have been fully employed during the past year, the volume of ordinary commercial business was less, owing to reduced export outlets. The reasons were: the raw material position, further extension of export licensing regulations, and the introduction or intensification of the war-time import controls.

**That the plastics industry** was not the Eldorado some people imagined it to be was a point made by Major S. M. Mohr, chairman of the British Plastics Federation, Ltd., at a luncheon at Grosvenor House on Tuesday, the aim of which was to launch a publicity campaign on behalf of plastics. The hazy idea that plastics were something mysterious should be dispelled by publicity of an educational nature, and the public should know that the plastics industry had its obstacles and problems as well as any other industry.

### Foreign News

**Complete control** over the U.S. production and delivery of carbon steel made in electric furnaces has been established by the issue of a W.P.B. Conservation Order.

**The manufacture of quinine** from cinchona bark produced in Tanganyika Territory has started at Dar-es-Salaam, according to a local news source.

*d*-**Ribose, formerly valued** at £3600 per lb., may be obtained in unlimited amounts from the liquor waste of American paper mills, according to Dr. Jonas Camlet of Miles Laboratories.

**The discovery of effective substitutes** for the tin alloys used in the manufacture of engine bearings is announced from the U.S. Naval Engineering Experiment Station, Annapolis.

**Twenty-two bodies** have been recovered from the ruins of a chemical works at Baelen-sur-Nèthe, Belgium, destroyed by two explosions, says the Independent Belgian News Agency. Part of the works had been requisitioned by the German Army.

**The discovery in New Zealand** of serpentine containing 35 per cent. magnesia and of mica suitable for electric condensers has been announced. The mica deposits are in Otago, and the serpentine is on Durville Island, Cook Strait.

**Ethide,** otherwise 1,1-dichloro-1-nitroethane, has been used satisfactorily at the University of New Hampshire as an insecticide for the protection of grain, flour, fabrics, and furs. It appears to be non-injurious to human beings, according to American Press reports.

**Experiments recently concluded** in Jamaica have shown that locally-grown castor oil can be used in locally-made lamps, in replacement of kerosene, an imported fuel which has for some time been in short supply. It is hoped, says the report, that an export trade in castor oil may be established.

**The U.S. Civil Service Commission** has begun a nation-wide search for experts to serve the War Production Boards new Controlled Materials Plan. Urgently sought are persons with industrial or engineering experience in the fields of copper, aluminium, carbon steel, and alloy steel, as well as in engineering materials such as plastics, rubber and construction materials. There is no maximum age limit for candidates.

**The urgency of the Germans' need** for non-ferrous scrap is revealed in the latest decree published in the French *Gazette Officielle* last week. By this law the land tax throughout France (as in Belgium) must be paid, not in money, but in non-ferrous metals. A scrap copper equivalent for cash is laid down, but other non-ferrous metals may be offered. A taxpayer unable to raise the whole amount in metal may pay the difference in money, but at twice the nominal amount of tax.

## Forthcoming Events

At a meeting of the East Midlands section of the **Institute of Chemistry,** jointly with the **Society of Chemical Industry,** to be held at 7 p.m., on **February 25,** in the Welbeck Hotel, Nottingham, Dr. L. J. Harris will give a lecture on "Vitamins in War."

Mr. J. Boulton will give a lecture on "The Importance of Dyeing Rate—An Interpretation for the Practical Dyer of Recent Researches in Dyeing" at a meeting of the Scottish section of the **Textile Institute,** in Glasgow, on **February 26.**

There will be a meeting of the **Chemical Society,** at 5.30 p.m., on **February 26,** in the Chemistry Theatre, University College of North Wales, Bangor. Professor T. P. Hilditch will give a lecture on "Chemical Concentration of Milk Fats."

A joint meeting of the **Food Group** with the Birmingham section of the **Society of Chemical Industry** will be held at the Chamber of Commerce, New Street, Birmingham, a 5.30 p.m., on **February 26,** when a discussion will take place on "War-Time Food Packaging."

Professor J. M. Gulland will repeat his lecture on "Aspects of Nucleotide Chemistry" at a meeting of the **Chemical Society,** jointly with the South Yorkshire sections of the **Institute of Chemistry** and the **Society of Chemical Industry,** at 5.30 p.m., on **February 26,** in the University, Western Bank, Sheffield.

Dr. H. A. Krebs will speak on "How Vitamins Act," to the South Yorkshire Section of the **Institute of Chemistry,** at 2.30 p.m., on **February 27,** in the rooms of the Sheffield Metallurgical Association, 198 West Street, Sheffield.

## Company News

**Reckitt and Sons, Ltd.,** announce the usual quarterly dividend of 5 per cent.

**English China Clays, Ltd.,** announce a dividend for 1942 of 1 per cent. (Nil).

**The Kern Oil Co., Ltd.,** announce a dividend of 6 per cent. (same).

**The Universal Asbestos Manufacturing Co., Ltd.,** announce a dividend, payable on March 1, on the 6 per cent. cumulative preference shares for the period September 2, 1942, to March 1, 1943.

**Doulton and Co., Ltd.,** announce a dividend for 1942 of 5 per cent. (same). The directors also recommend a capital bonus to ordinary stockholders of 5 per cent., tax free. The net profit was £115,006 (£36,768).

**Associated British Cellulose, Ltd.,** 351 Oxford Avenue, Slough, have increased their nominal capital by the addition of £2000 in £1 ordinary shares beyond the registered capital of £5000.

**Howard Baker (1933), Ltd.,** of the Vauxhall Soapery, Liverpool, have acquired the business and goodwill of J. R. Peace and Co., tar distillers, Rumford Place, Liverpool, and will control and manage both companies.

# Commercial Intelligence

**The following are taken from printed reports, but we cannot be responsible for errors that may occur.**

## Mortgages and Charges

**(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)**

MARCHON PRODUCTS, LTD., London, N.W., chemical manufacturers. (M., 20/2/43.) January 31, charge, to Whitehaven and West Cumberland Benefit Building Society securing £900 and any other moneys, etc., charged on cottages and warehouse at Swing Pump Lane and Ribton Lane, Whitehaven. *£500. March 31, 1942.

# Chemical and Allied Stocks and Shares

IN the absence of improvement in Stock Exchange business, there were again only small movements in security values, but on the other hand, the general undertone was satisfactory, there having been a very moderate amount of selling in evidence. Imperial Chemical at 38s. were unchanged on balance, and the 7 per cent. preference units were steady at 36s. Borax Consolidated deferred at 35s. were within 3d. of the level ruling a week ago, awaiting the dividend announcement. Firmness was maintained in B. Laporte, which were quoted at 78s. "middle"; in each of the past three years the dividend has been 15 per cent., but this has been a conservative payment, and last year approximately 22 per cent. was earned on the ordinary shares. Monsanto Chemicals 5½ per cent. preference were maintained at 22s. 6d. Elsewhere, business up to 10s. 3d. was recorded in Lawes Chemical 10s ordinary, and up to 6s. 9d. in Greeff-Chemicals 5s. ordinary. Dealings in Johnson Matthey 5 per cent. preference ranged up to 23s. 7½d. Elsewhere, William Blythe 3s. ordinary changed hands at 7s. 6d. at one time. Burt Boulton held their recent improvement to 19s. Rather more attention continued to be given to British Tar Products 5s. shares, which showed dealings up to 10s. 6d. In our last issue it was stated that British Tar Products shares "changed hands up to their par value of 10s." This was not correct, and we emphasise the fact that the par value of the shares is 5s.

Lever & Unilever improved to 34s. 3d., and British Oil & Cake preferred were better at 48s. At 14s. General Refractories 10s. ordinary were maintained on balance, and dealings up to 13s. were recorded in Goodlass Wall 10s. ordinary shares. Fisons held their recent rise to 44s. 4½d. Following the annual meeting, British Industrial Plastics 2s. ordinary improved from 5s. 1½d. to 5s. 4½d. Thomas De La Rue at 90s. were lower on balance, but among other securities of companies associated with plastics, Lacrinoid Products were better at 4s. 10½d., and Erinoid were quoted at 11s. 6d. In other directions, British Glues 4s. ordinary were maintained at 7s. 6d. British Plaster Board 5s shares remained at 27s. 6d. It may be recalled that in respect of the financial year ended March 31 last, the dividend of the latter company was raised from 15 per cent. to 25 per cent., and this was earned with a large surplus which allowed the carry forward to be increased from £112,325 to £265,072.

At 76s. 3d. Turner & Newall were the same as a week ago. British Match remained at 38s. 1½d., and British Aluminium at 49s. 3d., while British Oxygen at 76s. 6d. were slightly higher on balance. Among iron and steel issues, Stewarts & Lloyds were higher at 54s. 3d., Tube Investments 93s., United Steel 26s., and Dorman Long preferred ordinary improved to 37s. 6d. Morgan Crucible 5½ per cent. first preference were quoted at 25s. 7½d., and British Drug Houses ordinary at 22s. 6d. In other directions, Timothy Whites were 27s. 4½d., Saugers 22s., and Boots Drug 5s. ordinary were steady at 40s. In respect of the year ended March 31, 1942, the dividend of the last-named company was maintained at 24 per cent.; earnings on the shares exceeded this by 9½ per cent.

Associated Cement went back to 57s. 6d., and Wall Paper Manufacturers deferred reacted further from 36s. 3d. to 35s. 6d. On the other hand, Dunlop Rubber were slightly higher at 35s. 3d. Nairn & Greenwich remained at 62s. 6d., and Barry & Staines at 38s. 6d. Awaiting the dividend statement, International Paint were again 107s. 6d., but at 30s. 3d. Pinchin Johnson 10s. shares lost part of an earlier improvement. The units of the Distillers Co. were slightly lower at 86s. 6d., and a number of other widely-held securities were easier owing to the inactive conditions ruling on the Stock Exchange. Triplex Glass moved back to 31s. 7½d., United Molasses to 29s. 1½d., and Murex to 106s. 10½d. Southalls (Birmingham) 5s. shares were firm at 26s. on the increased profits and the raising of the dividend from 17½ per cent. to 20 per cent. Leading oil shares became less active and tended to move lower, but as in most other directions, little selling was in evidence.

# Prices of British Chemical Products

STEADY to firm price conditions generally rule in the market for heavy chemical products this week, and a moderate volume of fresh inquiry is reported from most sections. Contract supplies are being taken up at a steady rate and deliveries are well up to schedule. In the soda products section nitrate of soda is in steady call and a brisk demand is reported for bicarbonate of soda and soda ash. Caustic soda is going into consumption in good quantities at a firm range of prices, while yellow prussiate of soda remains a limited market in consequence of the supply position. Among the potash compounds outputs of home makers of permanganate are being steadily absorbed and a ready outlet is reported in respect of caustic potash and acid phosphate of potash. In the acid section there is a fair call for supplies of hydrochloric acid, and offers of oxalic acid are being readily taken up. Salicylic acid is steady. There has been little fresh in the general position of the coal-tar products during the week and prices remain unchanged.

MANCHESTER.—With most of the leading industrial consumers of chemicals in this part of the country already well booked, there has not been a great deal in the way of new buying on the Manchester market during the past week, though delivery specifications for the general run of alkali products have been on a satisfactory scale, while in the acid section, including sulphuric, oxalic, and hydrochloric, steady supplies are being absorbed. A fair trade is being done in carbonate of magnesia, and both carbonate and bicarbonate of ammonia. Throughout the market firm price conditions obtain, though there has been little actual change on balance for the week.

GLASGOW.—The position is unchanged in the Scottish heavy chemical trade during the past week both for home and foreign business. Prices remain very firm with no actual changes.

## Price Changes

**Rises**:—Benzol (crude); lead (white); potash, caustic (liquid); potassium nitrate; rapeseed oil (crude); sodium iodide.

**Falls**:—Lactic acid; lead acetate; lead (red).

## General Chemicals

**Acetic Acid.**—Maximum prices per ton: 80% technical, 1 ton £39 10s.; 10 cwt./1 ton, £40 10s., 4/10 cwt., £41 10s.; 80% pure, 1 ton, £41 10s.; 10 cwt./1 ton, £42 10s.; 4/10 cwt., £43 10s.; commercial glacial, 1 ton, £49; 10 cwt./1 ton, £50; 4/10 cwt., £51; delivered buyers' premises in returnable barrels, £4 10s. per ton extra if packed and delivered in glass.

**Acetone.**—Maximum prices per ton, 50 tons and over, £65; 10/50 tons, £65 10s.; 5/10 tons, £66; 1/5 tons, £66 10s.; single drums, £67 10s.; delivered buyers' premises in returnable drums or other containers having a capacity of not less than 45 gallons each. For delivery in non-returnable containers of 40/50 gallons, the maximum prices are £3 per ton higher. Deliveries of less than 10 gallons free from price control.

**Alum.**—Loose lump, £14 10s. per ton, f.o.b.

**Aluminium Sulphate.**—£10 15s. to £11 5s. per ton d/d.

**Ammonia, Anhydrous.**—1s. 9d. to 2s. 3d. per lb.

**Ammonium Carbonate.**—£38 to £39 per ton d/d in 5 cwt. casks.

**Ammonium Chloride.**—Grey galvanising £22 10s. per ton, in casks, ex wharf. Fine white 98%, £19 10s. per ton. See also Salammoniac.

**Antimony Oxide.**—£111 to £117 per ton.

**Arsenic.**—For 1-ton lots, £41 to £46 per ton, according to quality, ex store. Intermediate prices for intervening quantities.

**Barium Carbonate.**—MANCHESTER: precip. (4-ton lots), £16 per ton d/d.

**Barium Chloride.**—98/100%, prime white crystals, £16 10s. to £19 10s. per ton, bag packing, ex works; imported material would be dearer.

**Bleaching Powder.**—Spot, 35/37%, £11 to £11 10s. per ton in casks, special terms for contract.

**Borax, Commercial.**—Granulated, £31 10s.; crystals, £32 10s.; powdered, £33; extra fine powder, £34; B.P. crystals £40 10s.; powdered, £41; extra fine, £42 per ton for ton-lots, in free 1-cwt. bags, carriage paid in Great Britain. Borax Glass, lump, £83; powder, £84 per ton in tin-lined cases for home trade only, packages free, carriage paid.

**Boric Acid.**—Commercial, granulated, £52 15s.; crystals, £53 15s.; powdered, £54 15s.; extra fine powder, £56 15s.; B.P. crystals, £61 15s.; powdered, £62 15s.; extra fine powdered, £64 15s. per ton for ton lots in free 1-cwt. bags, carriage paid in Great Britain.

**Calcium Bisulphite.**—£6 10s. to £7 10s. per ton f.o.r. London.

**Calcium Chloride.**—70/72% solid, £5 15s. per ton, ex store.

**Charcoal, Lump.**—£10 10s. to £14 per ton, ex wharf. Granulated, supplies scarce.

**Chlorine, Liquid.**—£23 per ton, d/d in 16/17 cwt. drums (3-drum lots).

**Chrometan.**—Crystals, 5½d. per lb.

**Chromic Acid.**—1s. 5d. per lb., less 2½%, d/d U.K.

**Citric Acid.**—Controlled prices per lb., d/d buyers' premises. For 5 cwt. or over, anhydrous, 1s. 6¾d., other, 1s. 5d.; 1 to 5 cwt., anhydrous, 1s. 9d., other, 1s. 7d. Higher prices for smaller quantities.

**Copper Oxide.**—Black, £95 per ton.

**Copper Sulphate.**—£31 5s. per ton, f.o.b., less 2 per cent. in 2 cwt. bags.

**Cream of Tartar.**—100%, £18 12s. per cwt., less 2½%, d/d in sellers' returnable casks.

**Formaldehyde.**—£24 10s. to £26 per ton in casks, according to quantity, d/d. MANCHESTER: 40%, £24 10s. to £26 10s. per ton in casks, according to quantity, d/d.

**Formic Acid.**—85%, £47 per ton for ton lots, carriage paid; smaller parcels quoted up to 50s. per cwt., ex store.

**Glycerine.**—Chemically pure, double distilled 1260 s.g., in tins, £4 to £5 per cwt., according to quantity; in drums, £3 14s. 6d. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

**Hexamine.**—Technical grade for commercial purposes, about 1s. 4d. per lb.; free-running crystals are quoted at 2s. 1d. to 2s. 3d. per lb.; carriage paid for bulk lots.

**Hydrochloric Acid.**—Spot, 6s. 5½d. to 8s. 11d. per carboy d/d according to purity, strength and locality.

**Hydrofluoric Acid.**—59/60%, about 1s. to 1s. 2d. per lb.

**Iodine.**—Resublimed B.P., 10s. 4d. to 14s. 6d. per lb., according to quantity.

**Lactic Acid.**—Pale tech., 43½ per cent. by weight, £47 per ton; dark tech., 43½ per cent. by weight, £40 per ton ex works; barrels returnable carriage paid.

**Lead Acetate.**—White, 51s. to 52s. 6d. per cwt. MANCHESTER: £51 to £54 per ton.

**Lead Nitrate.**—About £47 per ton d/d in casks.

**Lead, Red.**—English, 5/10 cwt., £44 10s. per ton; 10 cwt. to 1 ton, £44 5s.; 1/2 tons, £44; 2/5 tons, £43 10s.; 5/20 tons, £43; 20/100 tons, £42 10s.; over 100 tons, £42 per ton, less 2½%, carriage paid, non-setting red lead, 10s. per ton dearer in each case.

**Lead, White.**—Dry English, less than 5 tons, £57; 5/15 tons, £53; 15/25 tons, £52 10s.; 25/50 tons, £52; 50/200 tons, £51 10s. per ton; less 5%, carriage paid; Continental material, £1 per ton cheaper Ground in oil, English, 1/5 cwt., £68 10s.; 5/10 cwt., £67 10s.; 10 cwt. to 1 ton, £67; 1/2 tons, £65 10s.; 2/5 tons, £64 10s.; 5/10 tons, £62 10s.; 10/15 tons, £61 10s.; 15/25 tons, £60 10s.; 50/100 tons, £60 per ton, less 5% carriage paid.

**Litharge.**—1 to 2 tons, £44 10s. per ton.

**Lithium Carbonate.**—7s. 9d. per lb. net.

**Magnesite.**—Calcined, in bags, ex works, £18 15s. to £22 15s. per ton.

**Magnesium Chloride.**—Solid (ex wharf), £16 to £18 per ton. MANCHESTER: £14 to £16 per ton.

**Magnesium Sulphate.**—Commercial, £12 to £14 per ton, according to quality, ex works.

**Mercury Products.**—Controlled price for 1 cwt. quantities: Bichloride powder, 15s. 8d.; bichloride lump, 16s. 3d.; ammon. chloride powder, 17s. 10d., ammon, chloride lump, 17s. 8d.; mercurous chloride, 18s. 7d.; mercury oxide, red cryst, 20s. 9d.; red levig., 20s. 3d.; red tech., 19s. 11d.; yellow levig., 20s. 2d.; yellow tech., 19s. 7d.; sulphide, red, 17s. 9d.

**Methylated Spirit.**—Industrial 66° O.P. 100 gals., 2s. 4d. per gal.; pyridinised 64° O.P. 100 gals., 2s. 5d. per gal.

**Nitric Acid.**—£24 to £26 per ton, ex works.

**Oxalic Acid.**—£60 to £65 per ton for ton lots, carriage paid, in 5-cwt. casks; smaller parcels would be dearer; deliveries slow.

**Paraffin Wax.**—Nominal.

**Potash, Caustic.**—Basic price for 50-100 ton lots. Solid, 88/92%, commercial grade, £53 7s. 6d. per ton, c.i.f. U.K. port, duty paid. Broken, £5 extra; flake, £7 10s. extra; powder, £10 extra per ton. Ex store, £3 10s. supplement. Liquid, d/d, £34 in lots of 1 ton.

**Potassium Bichromate.**—Crystals and granular, 7⅞d. per lb.; ground, 8⅛d. per lb., for not less than 6 cwt.; 1-cwt. lots, ¼d. per lb. extra.

**Potassium Carbonate.**—Basic prices for 50 to 100 ton lots; calcined, 98/100%, £52 10s. per ton, c.i.f. U.K. port. Ex warehouse, £55 5s. per ton.

**Potassium Chlorate.**—Imported powder and crystals, nominal.

**Potassium Iodide.**—B.P., 8s. 8d. to 12s. per lb., according to quantity.

**Potassium Nitrate.**—Small granular crystals, 55s. per cwt. ex store, according to quantity.

**Potassium Permanganate.**—B.P., 1s. 10d. per lb. for 1 cwt. lots; for 3 cwt. and upwards, 1s. 9½d. per lb.; technical, £7 18s. 6d. to £8 10s. 6d. per cwt., according to quantity d/d.

**Potassium Prussiate.**—Yellow, 5 cwt. to 7 cwt., casks, 1s. 6d. per lb., d/d; supplies scarce.

**Salammoniac.**—First lump, spot, £48 per ton; dog-tooth crystals, £50 per ton; medium, £48 10s. per ton; fine white crystals, £19 10s. per ton, in casks, ex store.

**Soda, Caustic.** — Solid 76/77%: spot, £16 7s. 6d. per ton d/d station.

**Sodium Acetate.**—£41 per ton, ex wharf.

**Sodium Bicarbonate.**—Refined, spot, £11 per ton, in bags.

**Sodium Bichromate.**—Crystals, cake and powder, 6¼d. per lb.; anhydrous, 6¼d. per lb., net, d/d U.K.

**Sodium Bisulphite Powder.**—60/62%, £19 10s. per ton d/d in 2-ton lots for home trade.

**Sodium Carbonate Monohydrate.**—£21 per ton d/d in minimum ton lots in 2 cwt. free bags.

**Sodium Chlorate.**—£36 to £45 per ton, d/d, according to quantity.

**Sodium Hyposulphite.**—Pea crystals, £20 per ton for 2-ton lots; commercial, £15 per ton; photographic, £22 per ton.

**Sodium Iodide.**—B.P., for not less than 28 lb., 9s. 11d. per lb., for not less than 7 lb., 13s. 1d. per lb.

**Sodium Metasilicate.**—£16 per ton, d/d U.K. in 1-ton lots.

**Sodium Nitrite.**—£20 to £23 per ton for ton lots.

**Sodium Percarbonate.**—21½% available oxygen, £7 per cwt.

**Sodium Phosphate.**—Di-sodium, £20 to £25 per ton d/d for ton lots. Tri-sodium, £26 to £30 per ton d/d for ton lots.

**Sodium Prussiate.**—8½d. to 9½d. per lb. ex store.

**Sodium Silicate.**—£6 to £11 per ton.

**Sodium Sulphate (Glauber Salts).**—£4 10s. ton d/d.

**Sodium Sulphate (Salt Cake).**—Unground. Spot £4 11s. per ton d/d station in bulk. MANCHESTER: £4 15s. per ton d/d station.

**Sodium Sulphide.** — Solid, 60/62%, spot, £17 15s. per ton, d/d, in drums; crystals, 30/32%, £12 7s. 6d. per ton, d/d, in casks.

**Sodium Sulphite.**—Anhydrous, £29 10s. per ton; pea crystals, spot, £20 10s. per ton d/d station in kegs; commercial, £12 to £14 per ton d/d station in bags.

**Sulphur.**—Per ton, for quantities of not less than 4 tons; ground, but not sieved, £15 10s.; ground and sieved, £17 15s. Controlled prices.

**Sulphuric Acid.**—168° Tw., £6 10s. to £7 10s. per ton; 140° Tw., arsenic-free, £4 11s. per ton; 140° Tw., arsenious, £4 3s. 6d. per ton. Quotations naked at sellers' works.

**Tartaric Acid.**—4s. 4d. per lb., less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 4s. 4d. per lb.

**Tin Oxide.**—Snow white, 305s.-315s. per cwt.

**Zinc Oxide.**—Maximum prices: White seal, £30 17s. 6d. per ton; red seal, £28 7s. 6d. d/d; green seal, £29 17s. 6d. d/d.

**Zinc Sulphate.**—Tech., £20-£21 per ton, carriage paid, casks free.

### Rubber Chemicals

**Antimony Sulphide.**—Golden, 1s. 2d. to 2s. 1½d. per lb. Crimson, 2s. 2d. to 2s. 6d. per lb.

**Arsenic Sulphide.**—Yellow, 1s. 9d. per lb.

**Barytes.**—Best white bleached, £8 3s. 6d. per ton.

**Cadmium Sulphide.**—6s. to 6s. 6d. per lb.

**Carbon Black.**—6d. to 8d. per lb., according to packing.

**Carbon Bisulphide.**—£34 per ton, according to quality, in free returnable drums.

**Carbon Tetrachloride.**—£46 to £49 per ton.

**Chromium Oxide.**—Green, 2s. per lb.

**India-rubber Substitutes.** White, 6 3/16d. to 10¼d. per lb.; dark, 6 3/16d. to 6 15/16d. per lb.

**Lithopone.**—30%, £25 per ton; 60%, £31 to £32 per ton. Imported material would be dearer.

**Mineral Black.**—£7 10s. to £10 per ton

**Mineral Rubber, "Rupron."**—£20 per ton.

**Sulphur Chloride.**—7d. per lb.

**Vegetable Lamp Black.**—£49 per ton.

**Vermilion.**—Pale or deep, 15s. 6d. per lb. for 7-lb. lots.
Plus 5% War Charge.

### Nitrogen Fertilisers

**Ammonium Phosphate Fertilisers.**—Type B. See Concentrated Fertilisers.

**Ammonium Sulphate.**—Per ton in 6-ton lots, d/d farmer's nearest station, August, £9 10s.; increased charge of 1s. 6d. per month up to March, 1943.

**Calcium Cyanamide.**—Nominal; supplies very scanty.

**Concentrated Fertilisers.**—Per ton in 6-ton lots d/d farmer's nearest station, in August: I.C.I. Type, "Special III," £14 9s. 6d.; Type "B," £14 1s. 3d.; Type "C," £17 19s. Increased charge of 1s. 6d. per month up to March, 1943.

**"Nitro Chalk."**—£9 14s. per ton in 6-ton lots, d/d farmer's nearest station.

**Sodium Nitrate.**—Chilean super-refined for 6-ton lots d/d nearest station, £15 5s. per ton; granulated, over 98%, £14 10s. per ton. Surcharges for smaller quantities unless collected at warehouse or depots.

### Coal Tar Products

**Benzol.**—Crude, 60's, 1s. 11d.; pure, 2s. 6d., per gal., ex works.

**Carbolic Acid.**—Crystals, 9½d. to 11½d. per lb. Crude, 60's, 4s. 3d. to 4s. 6d., according to specification. MANCHESTER: Crystals, 9¾d. to 11¾d. per lb., d/d; crude, 4s. to 4s. 6d., naked, at works.

**Creosote.**—Home trade, 6¼d. per gal., f.o.r., maker's works; exports, 6d. to 6¼d. per gal., according to grade. MANCHESTER: 6¼d. to 9d. per gal.

**Cresylic Acid.**—Pale, 97%, 3s. 6d. per gal.; 99%, 4s. 2d.; 99.5/100%, 4s. 6d. MANCHESTER: Pale, 99/100%, 4s. 6d. per gal.

**Naphtha.**—Solvent, 90/160°, 2s. 8d. per gal. for 1000-gal. lots; heavy, 90/190°, 2s. 2d. per gal. for 1000-gal. lots, d/d. Drums extra; higher prices for smaller lots. Controlled prices.

**Naphthalene.**—Crude, in 4-ton lots, in sellers' bags, £5 9s. to £8 9s. per ton, according to m.p.; hot-pressed, £10 5s. per ton; purified crystals, £19 to £35 per ton. Controlled prices.

**Pitch.**—Medium, soft, 45s. to 55s. per ton, f.o.b. MANCHESTER: 46s. per ton, at works.

**Pyridine.**—90/140°, 18s. per gal.; 90/160°, 13s. to 14s. MANCHESTER: 14s. to 18s. 6d. per gal.

**Toluol.**—Pure, 2s. 5d. nominal; 90's, 1s. 10d. per gal. MANCHESTER: Pure, 2s. 5d. per gal. naked.

**Xylol.**—For 1000-gal. lots, 3s. 1½d. to 3s. 4d. per gal., according to grade, d/d. Drums extra; higher prices for smaller lots. Controlled prices.

### Wood Distillation Products

**Calcium Acetate.**—Brown, £21 per ton; grey, £24. MANCHESTER: Grey, £24 to £25 per ton.

**Methyl Acetone.**—40/50%, £56 per ton.

**Wood Creosote.**—Unrefined, about 2s. per gal., according to boiling range.

**Wood Naphtha, Miscible.**—4s. 6d. to 5s. 6d. per gal.; solvent, 5s. 6d. per gal.

**Wood Tar.**—£5 per ton.

### Intermediates and Dyes (Prices Nominal)

*m*-**Cresol** 98/100%.—Nominal.

*o*-**Cresol** 30/31° C.—Nominal.

*p*-**Cresol** 34/35° C.—Nominal.

**Dichloraniline.**—2s. 8½d. per lb.

**Dinitrobenzene.**—8½d. per lb.

**Dinitrotoluene.**—48/50° C., 9½d. per lb; 66/68° C., 1s.

*p*-**Nitraniline.**—2s. 5d. per lb.

**Nitrobenzene.**—Spot, 5½d. per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyer's works.

**Nitronaphthalene.**—1s. 2d. per lb.; P.G., 1s. 0½d. per lb.

*o*-**Toluidine.**—1s. per lb., in 8/10 cwt. drums, drums extra.

*p*-**Toluidine.**—2s. 2d. per lb., in casks.

*m*-**Xylidine Acetate.**—4s. 5d. per lb., 100%.

### Latest Oil Prices

LONDON.—February 17.—For the period ending February 27, per ton, net, naked, ex-mill, works or refinery, and subject to additional charges according to package and location of supplies: LINSEED OIL, crude, £46 10s. RAPESEED OIL, crude, £54. COTTONSEED OIL, crude, £39 12s. 6d.; washed, £42 15s.; refined edible, £48; refined, deodorised, £49. COCONUT OIL, crude, £36 12s. 6d.; refined deodorised, £40. PALM KERNEL OIL, crude, £36; refined deodorised, £40; refined hardened deodorised, £44. PALM OIL, refined deodorised, £46; refined hardened deodorised, £49. GROUNDNUT OIL, crude, £44; neutralised and bleached, £48; refined hardened deodorised, £56 to £54. WHALE OIL, crude hardened, 42 deg., £39; refined hardened, 42 deg., £42. ACID OILS—Groundnut, £27 10s.; soya, £25 10s.; coconut and palm-kernel, £31. ROSIN, 26s. 6d to 33s. per cwt., ex wharf, according to grade. TURPENTINE, American, 87s. per cwt. in drums or barrels, as imported (controlled price).

## APPOINTMENTS VACANT

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